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TRAINING: AN ANSWER TO THE CHALLENGE OF OFFICE AUTOMATION

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Introduction

The term "office automation" is unquestionably a part of today's vocabulary, but what exactly does it mean? How does the reality it describes constitute a major challenge to business?

This report will attempt to provide an answer to these questions before going on to discuss training as a significant dimension of office automation. We hope to show that effective training is essential in order to meet the needs of today's workers. We also intend to indicate the new demands that work automation will impose on the school system, whose responsibility it is to train the workers of tomorrow.

Office Automation: the Convergence of Two Trends

As we near the end of the 20th century, we find ourselves in the throes of a technological revolution. Workers of the last century also experienced such a revolution, as a wave of mechanization and industrialization brought changes in the structure of work and in the very way of life. These were far-reaching changes which, history tells us, were not accomplished painlessly.

In a similar way, our society is going through a period of radical change. We have left behind a world of things to enter a world of signs. Fewer and fewer people handle things today, and in the future the production of goods will increasingly be performed by machine-tools and robots. Correspondingly, two thirds of workers are now in information-related jobs, and this shift in the concentration of labour is steadily becoming more pronounced.

The trend towards an increasingly information oriented labour force has been, accompanied by a veritable explosion in the volume of information and in the amount information traffic, which has left no area of human activity untouched. One result has been a decline in office productivity because workers are simply no longer capable of dealing with the growing mass of information. A well-known American study covering the decade from 1968-1978 stated that office productivity increased by only 4% compared with a 90% increase in industry and a 185% increase in agriculture.

Significantly, it was in the late 1970s that the development of computer technology began to accelerate: computers became more efficient (due to greater circuit integration), less costly and most important, accessible to all (with the advent of microcomputers).

Office automation thus appears as the convergence of two trends: first, a massive growth in the service sector of our economy with the emergence of an "information civilization", that has resulted in a productivity crisis, and second, a technological revolution of unprecedented dimensions which is having a powerful and direct impact on the office environment. One question that immediately comes to mind is whether these new technologies might provide a solution to the problem of declining office productivity.

Office Automation: the Interaction of Factors

The question of whether new technology will result in improved office productivity must be answered with caution. While computers can unquestionably make it easier to process and access information, many studies indicate that there is no direct link between the introduction of new technologies and increases in productivity. It should be emphasized that efficiency lies not in machines themselves, but in the use made of them. It has been observed that there is almost always a gap between the potential offered by a new technology and the actual use to which it is put (Bikson and Gutek 1983). Why is this so?

The primary reason why the full potential of office automation technology often remains unrealized is that the implementation of this technology is a highly complex process. Office automation involves the interaction of three factors: the technologies themselves, the people who see their jobs changing or even disappearing, and the organizational structures that must implement the change and ensure that the automation of work is profitable. Let us take a brief look at each of these factors before going on to see how Canadian business in general is handling the switch to office automation.

Technologies

Three points should be noted:

First, we are dealing with multiple technologies that are increasingly interrelated. Office automation includes more than just information systems: it also includes the development of office systems, telecommunications systems and the links between them. The combination of computers and telecommunications (telematics) now provides users with access to over 2,000 public data banks and a multitude of electronic mail services. Moreover, the fact that information can now be coded into digital signals, whatever its original nature (visual, audio, written, etc.), is of capital importance. The digitization of information has made it possible to transmit everything through the same network.

This said, the sad fact remains that, in spite of a clear trend towards increased interconnectivity the various types of hardware and software now on the market still have trouble communicating. We are suffering from a lack of compatibility, with the consequence that the process of mastering this technology is rendered more difficult. The issue of office equipment compatibility is now considered an important factor in the equipment purchasing decisions made by the Canadian government.

We must understand that the new technologies flooding into offices constitute a qualitative change: they are now electronic rather than mechanical. To use the terms coined by Jean Martineau, we are going from "tool-machines" to "system-machines", and the consequences of this are highly significant.

The tool-machine is monofunctional; it is a self-contained device that normally performs only one operation. An example would be the conventional typewriter. The tool-machine does not require complicated training and its impact on office organization and working methods is slight.

Conversely, the system-machine is multifunctional and can thus perform a variety of operations. Facsimile machines, for instance, combine the functions of photocopying and transmitting of texts, drawings and illustrations over a distance. The system-machine, instead of being isolated, may also become a link in a network. On the minus side, more skill is required to use these machines: they will require more extensive training, especially if programmable. The more powerful and complex a machine is, the greater its impact on work organization.

People

There is some controversy over the impact of office automation on jobs. It would appear that in the short term office automation results in increased unemployment, but that in the long term it is a factor which facilitates economic growth and gives rise to a net increase in jobs (Lapointe 1986). It is certain that it brings about job displacement and the modification of tasks. These changes affect all levels: from office workers, through middle management, to senior executives.

The relationship office workers have with information is basically one of production. It is evident that a number of routine and repetitive tasks can be taken over by computers with a consequent reduction in the number of manhours needed to complete these tasks. This situation can cause either job enrichment (for example a secretary who takes on an increasing amount of administrative support work) or deskilling (a common example being that of the word-processor operator who becomes confined to a pool, where the individual-machine relationship increasingly replaces interpersonal relationships).

At the top of the pyramid, the relationship of senior management with information is essentially one of communication. Top executives want direct access to the information they need for decision-making. This has led to the development of the integrated workstation (voice and data), which provides such varied possibilities as: the ability to access and manipulate the data in files, the capacity to conduct simulations and to use decision-making support functions, time management and meeting coordination functions, and the ability to select electronic or verbal modes of communication.

At the halfway point in the structure, junior and middle management positions are threatened, both from above and below. On the one hand, secretaries freed from some mechanical tasks are taking over some lower management responsibilities, while on the other, senior executives who have direct access to the information they require, can by-pass these levels.

Organizational Structure

Work automation is a collective undertaking, and it is thus the organization's task to manage this change by carefully planning the introduction of new technologies and by ensuring the smooth integration of office automation systems.

Business Experience With Office Automation

How has Canadian business handled the switch to office automation? With great difficulty. A survey of large companies by the Canadian Workplace Automation Research Centre (CWARC) brought to light problems common to all of them; these problems were situated at three different levels.

First, at the planning level. Plans to introduce new technologies often fail to take into account the needs of users, and are sometimes not even aimed at the right people. Those who have no need to communicate with each other, for instance, might be given access to electronic mail. Moreover, the technological plans are frequently unconnected to the specific goals of the organization and its global management information system. Totally unrelated pilot projects are often set up. There is also a lack of planning with respect to the human resources required to realize these projects.

Next, at the implementation level. It is difficult to establish a harmonious and complementary relationship between centralized data processing departments and other departments with automated office systems. Data processing departments are losing some of their former power and are being asked to provide support service for users and managers. Managers on the other hand, are responsible for the implementation process, but have limited authority with respect to the choice of equipment or the decision to experiment within their departments. User training and support is another area where not enough is done.

The CWARC study also brought to light problems in justifying work automation. The productivity measurement criteria currently used are often inadequate as they do not take into account all the costs of implementation. On the whole, there is no systematic assessment of the real effects of the automation process itself.

These somewhat discouraging observations do not apply only to large companies. Another CWARC study, carried out jointly with the Centre des dirigeants d'entreprise in Montreal, of small businesses, yielded similar conclusions: 80% of the companies that responded had no master plan and had made no cost-benefit analysis. The facts showed that the introduction of office automation costs these companies 200% more than projected.

Training: an Important Dimension

One point emerges clearly from all these observations: up to this time, there has been a tendency among decision-makers to concentrate almost exclusively on the technical aspects of office automation to the detriment of the human factor. A clear sign of this is the fact that, both in Canada and in the United States, companies attach very little importance to training. Traditionally, they have not considered training a priority and have made no systematic attempt to train their employees (Bikson and Gutek 1983). Similarly, fewer than 10% of the collective agreements between unions and employers in Quebec include clauses dealing with the employer's contribution to training and retraining programs (David-McNeil 1986).

This trend must be reversed. Training should not be seen as a more or less incidental stage in office automation, but rather as an essential aspect and should therefore be considered prior to, during and after the installation of new technology. In the same way, training cannot be dissociated from the information and consultation processes, through which all persons concerned become involved in the project from the earliest stages.

The goal of training must be twofold: efficiency and productivity for the organization, and satisfaction and competence for persons working for it. This philosophy forms the basis for the socio-technical approach developed by Emery Trist and taken up by Enid Mumford.

The goal of competence should be emphasized, since in an ever-changing labour market, this guarantees a certain amount of stability and security for the worker. Competence presupposes going beyond a purely operational approach to training that focusses on very limited, short-term goals, normally the operating procedures for a particular machine or software program. Unfortunately operation oriented retraining is the approach generally preferred by business and forms the bulk of adult education course offerings.

Although useful in certain circumstances, this approach does not provide users with a true grasp of the technology related to their work. It makes them capable of using a system, but does not enable them to understand its structure or potential. Users are thus prisoners of the features of a given system, (make of model of computer, type of hardware, software program, etc.), and are unable to transfer their knowledge laterally if further technological changes occur. Only a conceptual approach to training can promote adaptability to change and autonomy.

Having said this, there is obviously no single "right" way to design and develop a training program. The strategy adopted will vary with the needs of the individuals involved, the extent of their knowledge and receptiveness, and external constraints of time and place. Nevertheless, it should be emphasized that four factors are essential conditions for successful training, but are often mishandled in practice:

1) Training in office automation should consider the person as a whole and thus address the aspects of knowledge, ability and attitudes. This means that training personnel must not only have a mastery over the content of courses, but must also be well informed about the nature of the work performed by trainees and be sensitive to the possibility of resistance to change.

2) The time and money necessary for training must be made available. That it takes time to learn must be respected, as must the progression of training stages. It must be accepted that persons undergoing training may be less productive during this period. This will obviously cost money: normally one third of the total budget for introducing office automation (or the equivalent of the equipment budget) should be allocated to training.

3) Effective follow-up to training must be ensured to prevent it from becoming an isolated act. In this connection, users who will become resource persons and take over training must be identified and given more thorough training.

4) The training strategy as a whole must be constantly reassessed and teaching materials, in particular, must be continually updated and adapted to changing needs and work situations.

Office Automation and The School System

We have attempted to show the crucial importance of training as a means for developing and upgrading the skills of current workers. Although the educational system is involved in this process, its primary responsibility is naturally to the young people who are the workers of tomorrow. What kinds of demand does the advent of an increasingly computerized society make on the schools?

It has been said time and time again, and yet it bears repeating, that the worker of tomorrow must be flexible, mobile and able to adapt to changes in the work environment, particularly with respect to technological changes. These qualities can only be acquired if the schools are capable of accepting the three responsibilities described below.

First, they must make certain that everyone receives a basic education, that they acquire an adequate mastery of an official language. It is estimated that one fifth of the population in the United States is functionally illiterate, and thus unable to fill out a form, read instructions and the like. Closer to home, in Quebec we are rediscovering how important and basic a tool our language is, and once again we are making it a teaching priority. This was demonstrated in a series of reports on comprehensive schools recently broadcast by Radio-Canada on Le Point.

The second responsibility of the school system is to ensure that tomorrow's workers are computer literate. Schools must teach students to use computers intelligently, not only by teaching how to operate them, but also by giving students an understanding of computers and how they work. The schools must enable young people to develop a "computer mentality", so that they are on familiar ground when they arrive in an automated work situation. The greater part of this work must be carried out at the secondary school level, since 70% of young people go directly out into the labour market from that level.

The third responsibility is even more ambitious: to develop in young people the ability to analyse, to go beyond the facts, to reason. In their book entitled The Work Revolution, Schwartz and Neikirk emphasize that the schools have not been able to establish a clear distinction between facts, information and knowledge.

The education system has, to date, been obsessed with the teaching of facts, which could be handled to a great extent by computers. Information goes a step further by bringing facts together and organizing them, but it also leaves room for uncertainties, probabilities and hypotheses. Knowledge goes even further than information. It presupposes the ability to abstract, judge, integrate new facts and transfer knowledge. If, as many experts think, the automation of work will give rise to an even greater polarization of jobs into highly skilled and unskilled, then the schools must do their utmost to ensure that students acquire such essential tools as the ability to analyse and a taste for reasoning. The greatest service schools can render to the workers of tomorrow is to teach them to learn.

Conclusion

The computerization of work thus constitutes a major challenge, not only to business, but to society as a whole. It is of the utmost importance that training be seen not just as a secondary consideration, but as a major component in the process of implementing office automation technology, so that it can play its rightful part in the difficult process of adapting people to a changing world. Training, as an integral part of a coherent, global approach, is still the best response we can make to this challenge.

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